

**Notice of Allowability**

Application No.

09/608,856

Applicant(s)

YANG, JIN

Examiner

Samuel Broda

Art Unit

2123

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's Official Amendment & Response sent via facsimile on 23 March 2005.
2. ☒ The allowed claim(s) is/are 3-9, 11-15, 21-24 and 30-38.
3. ☒ The drawings filed on 30 June 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).


\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**SAMUEL BRODA, ESQ.**  
**PRIMARY EXAMINER**

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1. This communication is in response to Applicant's Official Amendment & Response (the "Amendment") sent via facsimile on 23 March 2005. In the Amendment, claims 3-4, 11-13, 21-23, and 30-31 were amended; claims 1-2, 10, 16-20, and 25-29 were canceled. Claims 3-9, 11-15, 21-24, and 30-38 are pending.

*Examiner's Amendment*

2.1 An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The Examiner's amendment changes the language of the preamble of independent claims 11 and 35 to more clearly identify the statutory subject matter of the claim.

Authorization for this Examiner's amendment was given in a 3 June 2005 telephone conversation with Mr. Lawrence Mennemeier, Reg. No. 51,003.

2.2 The application has been amended as follows:

In Claim 11, line 1, change:

"method"

to:

--computer-implemented method--.

In Claim 35, line 1, change:

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“method”

to:

--computer-implemented method--.

*Reasons for Allowance*

3. The following is an Examiner’s statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) a set of transformations for strongly connected subgraphs and a method of strengthening a strongly connected subgraph and determining reachability (Sipma et al, “Deductive Model Checking”);

(2) the encoding of data-space constraints used to decompose verifications by sets of case splits and to restrict verifications by validity conditions (Aagaard et al, “Formal Verification Using Parametric Representation of Boolean Constraints”); and

(3) the verification of an instruction-length marker using the combination of symbolic trajectory evaluation and lightweight theorem proving (Aagaard et al, “Combining Theorem Proving and Trajectory Evaluation in an Industrial Environment”).

3.1 Applicant’s first set of claims consists of claims 3-9, 11-15, and 21-24.

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Independent claim 3 is directed to a computer software product for strengthening a first antecedent label for an edge in an assertion graph; independent claim 11 is the corresponding computer-implemented method claim; independent claim 21 is the corresponding system claim. Each independent claim identifies the distinct limitations of: “joining any pre-images for antecedent labels of outgoing edges from the edge in the assertion graph” and “keeping, in the strengthened antecedent label for the edge, states already contained by the first antecedent label for the edge and also contained by the joined pre-images of antecedent labels of any outgoing edges from the edge.”

Because the closest prior art does not appear to teach or suggest strengthening antecedent labels using pre-images of antecedent labels, claims 3-9, 11-15, and 21-24 are deemed allowable.

**3.2** Applicant’s second set of claims consists of claims 30-31.

Independent claim 30 is directed to a verification system. This independent claim identifies the distinct limitations of: “strengthen an antecedent label for an edge in an assertion graph” and “concretize the first simulation relation computed for the edge to produce a second simulation relation for the edge.”

Because the closest prior art does not appear to teach or suggest strengthening antecedent labels for an edge to produce a second simulation relation for the edge, claims 30-31 are deemed allowable.

**3.3** Applicant’s third set of claims consists of claims 32-34.

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Independent claim 32 is directed to a verification system. This independent claim identifies the distinct limitation of: “to strengthen one or more antecedents representing pre-existing states and stimuli for an assertion, and to verify a justification property of the assertion using the one or more strengthened antecedent.”

Because the closest prior art does not appear to teach or suggest verification of justification properties using strengthened antecedents, claims 32-34 are deemed allowable.

**3.4** Applicant’s fourth set of claims consists of claims 35-38.

Independent claim 35 is directed to a computer-implemented method. This independent claim identifies the distinct limitations of: “strengthening said at least one antecedent of the assertion” and “verifying said justification property using the at least one strengthened antecedent and said at least one consequence.”

Because the closest prior art does not appear to teach or suggest verification of justification properties using strengthened antecedents and consequences, claims 35-38 are deemed allowable.

**4.** Any comments considered necessary by Applicants must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

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5. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (571) 272-3709. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Leo Picard can be reached at (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (571) 272-2100.



**SAMUEL BRODA, ESQ.  
PRIMARY EXAMINER**